CLAIMS

What is claimed is:

1. A linear compressor having a core combined to one end of a piston to detect a position of the piston reciprocally moving up and down, and a first sensor coil and a second sensor coil detecting the position of the core, wherein the core comprises:

an upper core having a length shorter than one half of the length of the first sensor coil and the second sensor coil in series.

2. The linear compressor according to claim 1, wherein the core further comprises:

a lower core being spaced from the upper core by a predetermined distance.

3. The linear compressor according to claim 2, wherein a middle point between the upper core and the lower core passes a middle point between the first sensor coil and the second sensor coil when the piston passes a center point of a reciprocal moving path of the piston.

4. The linear compressor according to claim 1, comprising:

a first branch comprising the first sensor coil and a predetermined first dividing resistor connected in series;

a second branch comprising the second sensor coil and a predetermined second dividing resistor connected in series;

a power source applied to the first branch and the second branch; and

a voltage comparator that receives voltages applied to the first dividing resistor and the second dividing resistor as inputs.

5. The linear compressor according to claim 4, wherein the voltage comparator receives voltages taken from the opposite terminals of each of the first sensor coil and the second sensor coil as the inputs.

6. The linear compressor according to claim 1, further comprising a controller controlling the position of the piston based on a top dead center detected by measuring a time that a center point of the upper core takes to pass a coil origin, or a middle point between the first sensor coil and the second sensor coil, according to reciprocal movement of the piston.

7. The linear compressor according to claim 2, further comprising a controller controlling the position of the piston based on a top dead center detected by measuring a time that the center point of the upper core takes to pass the coil origin, or the middle point between the first sensor coil and the second sensor coil, according to the reciprocal movement of the piston.

8. The linear compressor according to claim 4, further comprising a controller controlling the position of the piston by detecting a top dead center based on the time taken for an output of the voltage comparator to become 0 twice as the piston is positioned near the top dead center.

9. The linear compressor according to claim 5, further comprising a controller controlling the position of the piston by detecting a top dead center based on a time taken for the output of the voltage comparator to become 0 as the piston is positioned near the top dead center.

10. The linear compressor according to claim 2, further comprising a controller detecting an offset value indicating the degree a center point of reciprocation movement of the piston is off from a predetermined center point by measuring a difference of time that a center point of the upper core takes to pass a coil origin positioned at a middle point between the first sensor coil and the second sensor coil, and by measuring an elapsed time that a center point of the lower core takes to pass the coil origin according to the reciprocal movement of the piston.

11. A control method of a linear compressor having a core combined to one end of a piston moving up and down, and a first sensor coil and a second sensor coil detecting a position of the core, comprising:

forming the core comprising an upper core and a lower core separated from each other;

detecting a top dead center of the piston by measuring a time that a center point of the upper core takes to pass a middle point between the first sensor coil and the second sensor coil according to reciprocal movement of the piston; and

controlling a position of the piston on a basis of the top dead center.

12. A method for controlling an operation of a linear compressor having an upper core and a lower core combined to a shaft of a piston, and a first sensor coil and a second sensor coil detecting a position of the piston, comprising:

timing the upper core driven by the piston through a stroke cycle;

receiving the time and calculating a top dead center position based on the time; and

controlling a piston stroke according to the calculated top dead center, by varying the power driving the linear compressor.

13. The method of claim 12, wherein the calculating the top dead center is based on the elapsed time of the upper core passing a mid point, of the first sensor coil and the second sensor coil, during a compression stroke and passing the mid point, of the first sensor coil and the second sensor coil, during an extension stroke of the piston.

14. The method of claim 12, further comprising determining an offset value based on a difference between a predetermined center point and an actual center point of the piston stroke, wherein the offset value is determined by measuring a time that elapses when a center point of the lower core passes the mid point, of the first sensor coil and the second sensor coil, a first time and then passes the mid point, of the first sensor coil and the second sensor coil, a second time during a stroke.

15. A linear compressor piston control device, comprising:

a sensor body having an annular shape defining an aperture;

a sensor coil disposed in the sensor body;

a core having a lower part and an upper part attached to a piston disposed coaxially in the aperture of the sensor body, wherein the lower part and the upper part are less than one half the length of the sensor coil; and

a controller controlling a position of the piston by determining a top dead center based on signals from the sensor coil sensing the position of the lower part of the core and the upper part of the core.

16. The control device according to claim 15, wherein the controller measures a time that elapses when the upper part passes a mid point of the sensor coil during a compression stroke and then passes the mid point of the sensor coil during an extension stroke of the piston.

17. The control device according to claim 15, further comprising the controller determining an offset value based on a difference between a predetermined center point and an actual center point of a piston stroke, wherein the offset value is determined by measuring a time that elapses when a center point of the lower part passes the mid point of the sensor coil a first time and then passes the mid point of the sensor coil a second time during a stroke.

18. The control device according to claim 15, wherein the sensor coil includes a first sensor coil and a second sensor coil.

19. The control device according to claim 18, wherein the first sensor coil and the second sensor coil have the same number of turns, size and inductance value.

20. The control device according to claim 19, wherein the control device further comprises:

a first branch having a first predetermined dividing resistor connected in series with the first sensor coil; and

a second branch having a second predetermined dividing resistor connected in series with the second sensor coil.

21. The control device according to claim 20, further comprising:

a voltage comparator that receives voltage inputs from the first branch and the second branch and outputs a comparator signal; and

a digital signal processor that receives the comparator signal and sends an output signal to the controller based on the comparator signal.

22. The control device according to claim 21, further comprising:

the controller determining the top dead center by measuring the time that elapses between the comparator signal equaling 0 a first time during a compression stroke and the comparator signal equaling 0 a second time during an extension stroke.